

CLAIMS

- SupA
1. An apparatus for multi-cast transmissions that minimize channel resources, comprising:
- a memory element; and
 - a processing element for executing a set of instructions stored in the memory element, the set of instructions for:
 - generating an identifier for a group of subscribers, wherein the identifier is for accessing a multi-cast service;
 - using channel quality information for at least one subscriber to determine the timing of the multi-cast service to the group of subscribers;
 - and
 - transmitting the identifier and the multi-cast service on at least one channel, wherein the multi-cast service is transmitted in accordance with the timing determined by the channel quality information.
2. The apparatus of Claim 1, wherein transmitting the identifier and the multi-cast service on at least one channel comprises:
- transmitting the identifier on a first channel; and
 - transmitting the multi-cast on a second channel.
3. The apparatus of Claim 2, wherein the processing element is further for executing instructions for:
- scrambling the multi-cast service before transmitting the multi-cast service on the second channel, wherein the scrambling is performed by using a code known only to the group of subscribers.
4. The apparatus of Claim 1, wherein using channel quality information for at least one subscriber to determine the timing of the multi-cast service comprises:

4 choosing channel quality information by selecting the channel
quality information associated with the subscribers with the worst channel
6 conditions; and

8 determining the timing of the multi-cast service in accordance with
the subscribers with the worst channel conditions.

5. The apparatus of Claim 4, wherein the channel quality information
2 is a measurement of the channel interference of the forward link common pilot
signal.

6. The apparatus of Claim 4, wherein the channel quality information
2 is derived from the transmission power levels of a base station.

7. The apparatus of Claim 4, wherein the channel quality information
2 is a plurality of acknowledgment signals.

8. The apparatus of Claim 7, wherein choosing the channel quality
2 information of the subscribers with the worst channel conditions comprises:

transmitting a plurality of test data packets to the group of
4 subscribers;

waiting for a plurality of acknowledgment signals from the group of
6 subscribers in response to the plurality of test data packets; and

transmitting the multi-cast service if the plurality of
8 acknowledgment signals indicates a response from a predetermined percentage
of the group of subscribers.

9. The apparatus of Claim 1, wherein using channel quality
2 information for at least one subscriber to determine the timing of the multi-cast
service comprises:

4 choosing the channel quality information of the subscriber with the worst
channel conditions;

6 determining the timing of the multi-cast service in accordance with the
subscriber with the worst channel condition.

10. The apparatus of Claim 9, wherein the channel quality information
2 is an acknowledgment signal from the subscriber with the worst channel
condition.

11. An apparatus for multi-cast transmissions that minimize channel
2 resources, comprising:

a memory element; and

4 a processing element for executing a set of instructions stored in
the memory element, the set of instructions for:

6 generating an identifier for a group of subscribers, wherein the
identifier is for accessing a multi-cast service;

8 using channel quality information for at least one subscriber to
determine the transmission format of the multi-cast service to the group
10 of subscribers; and

12 transmitting the identifier and the multi-cast service on at least one
channel, wherein the multi-cast service is transmitted in accordance with
the transmission format determined by the channel quality information.

12. The apparatus of Claim 11, wherein transmitting the identifier and
2 the multi-cast service on at least one channel comprises:

transmitting the identifier on a first channel; and

4 transmitting the multi-cast on a second channel.

13. The apparatus of Claim 12, wherein the processing element is
2 further for executing instructions for:

4 scrambling the multi-cast service before transmitting the multi-cast
service on the second channel, wherein the scrambling is performed by
using a code known only to the group of subscribers.

14. The apparatus of Claim 11, wherein using channel quality
2 information for at least one subscriber to determine the transmission format of
the multi-cast service comprises:

8 determining the transmission format of the multi-cast service in
accordance with the subscribers with the worst channel conditions.

16. The apparatus of Claim 14, wherein the channel quality
2 information is derived from the transmission power levels of a base station.

17. The apparatus of Claim 14, wherein the channel quality
2 information is a plurality of acknowledgment signals.

18. The apparatus of Claim 17, wherein choosing the channel quality
2 information of the subscribers with the worst channel conditions comprises:

transmitting a plurality of test data packets to the group of
4 subscribers;

6 waiting for a plurality of acknowledgment signals from the group of subscribers in response to the plurality of test data packets; and

transmitting the multi-cast service if the plurality of
8 acknowledgment signals indicates a response from a predetermined percentage
of the group of subscribers.

19. The apparatus of Claim 11, wherein using channel quality
2 information for at least one subscriber to determine the transmission format of
the multi-cast service comprises:

4 choosing the channel quality information of the subscriber with the worst channel conditions;

6 determining the transmission format of the multi-cast service in
accordance with the subscriber with the worst channel condition.

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20. The apparatus of Claim 19, wherein the channel quality
2 information is an acknowledgment signal from the subscriber with the worst
channel condition.

21. An apparatus for multi-cast transmissions that minimize channel
2 resources, comprising:

a memory element; and

4 a processing element for executing a set of instructions stored in
the memory element, the set of instructions for:

6 determining the channel quality information for a plurality of
subscribers;

8 identifying the subscriber with the worst channel conditions;

10 scrambling a multi-cast service using a scrambling code known to
the plurality of subscribers; and

12 transmitting the scrambled multi-cast service to the plurality of
subscribers, wherein the scrambled multi-cast service is transmitted in
accordance with a transmission format that is optimal for the subscriber
14 with the worst channel conditions.

22. A method for broadcasting to a group of subscribers in a cellular
2 communication network, comprising:

determining the channel quality information for a plurality of subscribers;

4 identifying the subscriber with the worst channel conditions;

6 scrambling a multi-cast service using a scrambling code known to the
plurality of subscribers; and

8 transmitting the scrambled multi-cast service to the plurality of
subscribers, wherein the scrambled multi-cast service is transmitted in
accordance with a transmission format that is optimal for the subscriber with the
10 worst channel conditions.

23. A method for broadcasting to a group of subscribers in a cellular
2 communication network, comprising:

4 generating an identifier for a group of subscribers, wherein the identifier
is for accessing a multi-cast service;

using channel quality information for at least one subscriber to determine
6 the timing of the multi-cast service to the group of subscribers; and

transmitting the identifier and the multi-cast service on at least one
8 channel, wherein the multi-cast service is transmitted in accordance with the
timing determined by the channel quality information.

24. A method for broadcasting to a group of subscribers in a cellular
2 communication network, comprising:

generating an identifier for a group of subscribers, wherein the identifier
4 is for accessing a multi-cast service;

using channel quality information for at least one subscriber to determine
6 the transmission format of the multi-cast service to the group of subscribers;
and

8 transmitting the identifier and the multi-cast service on at least one
channel, wherein the multi-cast service is transmitted in accordance with the
10 transmission format determined by the channel quality information.

25. A method for efficient multi-cast broadcasting, comprising:

2 generating an identifier for a group of subscribers, wherein the identifier
is for accessing a multi-cast service;

4 identifying the subscriber with the worst channel quality by analyzing a
plurality of channel quality feedback indicators from a group of subscribers;

6 selecting a timing and a transmission format of the multi-cast service so
that the multi-cast service will be received by the subscriber with the worst
8 channel conditions; and

transmitting the identifier on a first channel and the multi-cast service on
10 a second channel in accordance with the timing and the transmission format as
determined by the subscriber with the worst channel quality.

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